



# UNITED STATES PATENT AND TRADEMARK OFFICE

NY

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/619,968	07/15/2003	Byron Vencent Bell	2001-0699.08	7836

21972 7590 01/20/2004

LEXMARK INTERNATIONAL, INC.  
INTELLECTUAL PROPERTY LAW DEPARTMENT  
740 WEST NEW CIRCLE ROAD  
BLDG. 082-1  
LEXINGTON, KY 40550-0999

EXAMINER

BROOKE, MICHAEL S

ART UNIT PAPER NUMBER

2853

DATE MAILED: 01/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/619,968

Applicant(s)

BELL ET AL.

Examiner

Michael S. Brooke

Art Unit

2853

NW

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 07/15/03.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 6, 7 and 16 are objected to because of the following informalities:

Claim 6 recites "a desired power per unit volume condition." It is unclear as to what feature has a "volume." For the purposes of examination, the Examiner will interpret this limitation to mean the volume of ink.

In claim 7, "i" is missing from the integral.

2. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1- 8, 12-16 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Ikeda et al. (4,567,493).

With respect to claims 1, 2, 8 and 15, Ikeda et al. teaches an ink jet print head wherein the thickness and area of the heater is selected so that a desired power consumption, and hence ink ejecting energy is obtained (col. 6:63-68). The ink ejecting energy produces a stable ink ejection (col. 2:42-46) at the desired energy range.

With respect to claim 3, the heater has a length and width.

With respect to claim 4, the heater would inherently have a sheet resistance.

With respect to claim 5, the heater would necessarily be provided with an electric current to eject ink, as this is how a thermal ink jet print head operates.

With respect to claim 6, since the amount of power to eject the ink drop is determined, it would follow that the a desired amount of power per volume of the ink drop would also have been determined.

With respect to claim 7, the claimed formula is analogous to Ohm's Law. Ohm's law can be expressed as:

$$I = \Delta V/R$$

The claimed formula teaches the same relationships, except in terms of the electric energy, rather than the potential difference. Thus, it is the Examiner's position that the claimed formula merely states well known physical relationships.

With respect to claim 12, the area of a quadrilateral shape is determined by multiplying the width by the length.

With respect to claim 13, the area and thickness are used to determine a stable ink ejection.

With respect to claim 14, the thickness and area are calculated.

With respect to claim 16, the ink jet heater includes the thickness of an overcoat (208, 209) and the resistor layer (211).

With respect to claim 20, the heater is fired at the stable ink jetting energy range.

The steps of the method of claims 1-8, 12-16 and 20 are deemed to be inherent in view of the functions of the apparatus of Ikeda et al.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 9 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda et al. (4,567,493) in view of Prasad et al. (6,309,052).

Ikeda et al. teaches the claimed invention with the exception of the ejection energy being in the range of from about 0.007 to about 1.19 microjoules, the heater having an area of between 50 to 500 sq. microns and a thickness of about 500 to 6000 angstroms.

Prasad et al. teaches an ink jet printer having a heater (604, 608) with an area of 200 sq. microns and a thickness of 900 angstroms. The heater ejects an ink droplet using an ejection energy of 0.8 to 1.0 microjoules (col. 12:43). This provides the advantages of allowing more resistors to be used to increase printing resolution, while preventing an excessive build up of thermal energy (col. 11:11-23).

It would have been obvious to one of ordinary skill in the ink jet art, at the time the invention was made, to have provided Ikeda et al. with a heater having an area of between about 50 to 500 sq. microns, a thickness of about 500 to 6000 angstroms and which uses between about 0.007 to about 1.19 microjoules to eject an ink drop, in order to increase printing resolution, while prevent excessive heating of the head, as taught by Prasad et al.

6. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda et al. (4,567,493) in view of Shirato et al. (4,392,907).

Ikeda et al. teaches the claimed invention with the exception of the thickness of a passivation layer and a cavitation layer being figured into the calculation.

Shirato et al. teaches an ink jet print head having a heater layer (8) and protective layers (9 and 10). Shirato further teaches that the thickness of the protective layers has a significant influence on the amount of energy that is required to discharge an ink droplet (col. 7:48-68 and col. 8:1-4).

Thus, it would have been obvious to one of ordinary skill in the art to include the thickness of the passivation layer and of the cavitation layer of Ikeda et al. in any calculation of ejection energy, in order to accurately determine what ejection energy is needed to produce a stable droplet ejection, as taught by Shirato et al.

The steps of the method of claims 9-11 and 17-19 are deemed to be rendered obvious in view of the functions of the combination disclosed above.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael S. Brooke whose telephone number is 703-305-0262. The examiner can normally be reached on M-F 5:30-2:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D. Meier can be reached on 703 308-4896. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Art Unit: 2853

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4900.

A handwritten signature in black ink, appearing to read "Michael S. Brooke". The signature is stylized with a large, looped "M" and a long, sweeping "B".

Michael S. Brooke  
Examiner  
Art Unit 2853

MSB  
12/29/03